REMARKS

The Examiner rejects Claims 1-2, 6-12, 14-15, 21-23, 27-29, and 30-31 under 35 U.S.C.§102 as being anticipated by either Dunn et al. (U.S. 6,580,793) or Pruett et al. (U.S. H1,885); Claims 3-4, 13, and 24-25 under 35 U.S.C.§103(a) as being unpatentable over Dunn et al. as applied to Claims 2, 11, and 23 above; and Claims 5 and 26 under Section 103(a) as being unpatentable over Dunn et al. in view of Toshiyuki, et al. (JP 05268121).

Applicant respectfully traverses the Examiner's rejections because the references fail to teach or suggest at least the italicized features in independent Claims 1, 11, and 21:

> 1. A method for performing echo cancellation within a switching center of a communication network, said switching center being coupled to a plurality of local user devices and a plurality of external transmission media, said method comprising the steps of:
> providing a pool of echo cancellation units within said switching center;
> coupling a first local user device to a first external transmission medium as part of a communication connection between the first local user device and a remote user device;
> *monitoring the first external transmission medium for at least one of echo cancellation activity and echo energy during the communication connection between the first local user device and the remote user device;*
> *when the detected at least one of echo cancellation activity and echo energy is above a determined threshold, allocating a first echo cancellation unit from the pool of echo cancellation units to the communication connection;* and
> *when the detected at least one of echo cancellation activity and echo energy thereafter falls below the determined threshold, discontinuing the allocation of the first echo cancellation unit to the communication connection.*
>
> 11. A switching center for use within a communication network, comprising:
> a plurality of first ports for use in coupling the switching center to a plurality of local user devices;
> a plurality of second ports for use in coupling the switching center to a plurality of external transmission media, each of said plurality of external transmission media being coupled at an opposite end to another switching center within the communication network;
> a switch for selectively coupling individual first ports to individual second ports within the switching center for use in establishing communication connections between local user devices and remote user devices in the communication network;

a pool of echo cancellation units that are each capable of reducing echoes received by said switching center from an external transmission medium; and

an allocation unit for allocating an echo cancellation unit from said pool of echo cancellation units to a communication connection being supported by the switching center *in response to detection of echo energy above a threshold level from an external transmission medium associated with said communication connection and terminating allocation of the echo cancellation unit to the communication connection in response to detection of echo energy below the threshold level.*

21. A method for performing echo cancellation within a switching center of a communication network, said switching center being coupled to a plurality of local user devices and a plurality of external transmission media, said method comprising the steps of:

providing at least one echo cancellation unit within said switching center;

coupling a first local user device to a first external transmission medium as part of a communication connection between the first local user device and a remote user device;

*when at least one of echo cancellation activity and echo energy on the first external transmission medium is above a determined threshold,* performing echo cancellation with the at least one echo cancellation unit on the communication connection;

*thereafter monitoring the first external transmission medium for at least one of echo cancellation activity and echo energy; and*

*when the detected at least one of echo cancellation activity and echo energy thereafter falls below the determined threshold, discontinuing echo cancellation of signals on the first external transmission medium.*

Dunn et al.

Dunn et al. is directed to an echo cancellation system comprising a switch for selecting between an echo canceled signal and the untreated signal. "When a communications session (e.g., a call) is initiated on a facility served by the system, the system initially allocates an echo canceller to that facility." (Col. 4, lines 53-56.) The echo canceled signal is used when an echo comparison system determines that the difference between the echo-canceled signal and the untreated signal is large while the untreated signal is used when the comparison system determines that the difference is small. "If the system determines than an insignificant echo is present, the echo canceller is

deactivated, and preferably made available for allocation to another facility when needed." (Col. 4, lines 56-59; See also col. 7, lines 38-40 and col. 9, lines 21-27.)

Unlike the present invention, the echo canceller is assigned initially to the channel automatically if an echo canceller is available *regardless of whether the canceller is required*. At col. 9, lines 17-20, Dunn et al. in fact states that "[i]n operation, when a previously idle input channel commences operation, the control and allocation unit 422 allocates an available echo canceller, if there are any, to service the channel." (See also col. 6, lines 15-33; col. 7, lines 27-39.)

Pruett et al.

Pruett et al. is directed to a method of processing wireless communications that allows echo cancellers to be controllably allocated by a controller element 104 to telecommunications channels. In the method, signaling data exchanged during call set-up is used by the controller 104 to determine whether a source of echo may be present in a telecommunications channel, such as a hybrid interface between a two-wire system and a four-wire system (col. 5, lines 15-25, and col. 9, line 61-col. 10, line 15).

Contrary to the Examiner's assertion, Pruett et al. does not inherently apply a method to detect echo in a signal, such as the detection of echo energy and/or a level of echo cancellation activity. At col. 9, line 64-col. 10, line 10, Pruett states as follows:

> Echo indication data may be determined by comparing the call destination or origination data to predetermined values stored in a data table of the telecommunications switch. Alternatively, echo indication data may be determined by analyzing the signal or other suitable methods. For example, the signaling data may indicate that the call has been routed from a four wire conductor to a two wire conductor, that the calling party is calling from a land-based telephone headset (land party data), or the telecommunications system call

> processing system may determine that other sources of echo are present. The signaling data may also be compared to a table of predetermined data values that indicate whether an echo signal may be present on the telecommunications channel.

Thus, Pruett et al. teaches the use of information in the signal other than echo energy and/or echo cancellation activity to determine if there is a potential source of echo energy.

Not only does Pruett et al. fail to teach or suggest activating echo cancellation in response to a high degree of echo energy and/or echo cancellation activity but also Pruett et al. fail to teach or suggest the deactivating echo cancellation during a call in response to a low degree of echo cancellation activity or echo energy. Pruett et al. specifically states that echo cancellation is terminated "after the call reaches a state of completion." (Col. 5, lines 57-59; *see also* col. 12, lines 20-26.)

Toshiyuki, et al. fails to overcome these deficiencies of Dunn et al. and Pruett et al. According to Toshiyuki, the initial decision on whether or not echo cancellation is used is based not on echo cancellation activity or echo energy but on whether or not the call is long distance. If the call is a local call, it does not appear that echo cancellation is performed. Although Toshiyuki teaches that echo cancellation is stopped before the call terminates, it is not stopped based on echo cancellation activity or echo energy but on the expiration of a selected time period. To reinitiate echo cancellation, the subscriber must press a button. This approach is highly undesirable, as the subscriber will experience rapid drops in voice quality and must manually press a button to restart echo cancellation. In a long call, the subscriber may have this cycle repeated numerous times. The approach of the present invention, namely basing echo cancellation need directly or indirectly on the actual echo energy levels encountered, is superior to the manual approach of Toshiyuki.

Accordingly, the claims are allowable over the cited art.

The dependent claims provide further bases for allowance.

Dependent claim 2 requires the allocating and discontinuing steps are performed and the further steps of thereafter monitoring the first external transmission medium for at least one of echo cancellation activity and echo energy during the communication connection between the first local user device and the remote user device and when the detected at least one of echo cancellation activity and echo energy is above a determined threshold, again performing echo cancellation on the communication connection. Dependent claim 12 requires a first local user device to be coupled to a first external transmission medium as part of a first communication connection between the first local user device and a remote user device, the allocating and terminating operations to be performed with respect to the first communication connection, and the allocation unit to thereafter monitor the first communication connection, while the first local user device and remote user device are coupled to the first external transmission medium, for at least one of echo cancellation activity and echo energy. Dependent claim 22 requires the echo cancellation to be discontinued and the performing step to be thereafter repeated on the first external transmission medium during the communication connection between the first local user device and a remote user device. These claims are effectively directed to a pool of undedicated echo cancellers which are dedicated to communication channels on an "as needed" basis. Assignment occurs automatically whenever echo cancellation activity and/or echo energy is above a determined threshold. Reassignment to another channel occurs automatically whenever echo cancellation activity and/or echo energy falls below the determined threshold. This feature is neither taught nor suggested by the cited references. For example, Dunn

et al., unlike the present invention, teaches that, once deactivated, the echo canceller is not later reassigned to the channel in the event that a substantial amount of echo energy is later introduced into the channel (col. 10, lines 20-25, and col. 10, lines 56-62).

Dependent claims 3, 7, and 24 require the at least one of echo cancellation activity and echo energy to be echo cancellation activity. In contrast to the present invention, Dunn et al. teaches that the determination to terminate echo cancellation is based indirectly on echo energy and not on echo cancellation activity.

Dependent claim 10, which depends from claim 6, requires that, when the detected at least one of echo cancellation activity and echo energy fails to exceed the determined threshold within a predetermined time interval after allocating the call classifier, the call classifier terminates the monitoring step.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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